WHAT IS CLAIMED IS

Sub A1

1. A system for reducing noise in a signal line, through which upward signals and downward signals are transmitted between a center and terminals, comprising:

a noise-reduction device, provided between the center and the terminals, which attenuates the upward signals by an increased amount when a noise increase regarding the upward signals is detected on the signal line; and

a noise-control device, provided at terminals, which boosts a transmission level of the upward signals by an amount compensating for the attenuation of the upward signals by said noise-reduction device.

2. The system as claimed in claim 1, wherein said noise-reduction device includes:

a noise-level-check unit which makes a comparison between a signal component and a noise component that are obtained from the signal line, and detects a noise increase based on the comparison; and

a noise-reduction unit which includes an attenuator that attenuates the upward signals by the increased amount if said noise-level-check unit detects the noise increase, and which transmits a tone signal via the downward signals if said noise-level-check unit detects the noise increase.

3. The system as claimed in claim 2, wherein said noise-control device includes:

a tone-detection unit which detects the tone signal; and

a variable amplifier which boosts amplification of the upward signals by an amount compensating for the attenuation of the upward signals by said attenuator.

A' cont'd

4. The system as claimed in claim 1, wherein one or more noise-reduction devices including said noise-reduction device are provided in one or more of a two-way-amplification unit and splitter units provided between the center and the terminals.

5. The system as claimed in claim 4, wherein said noise-control device boosts the transmission level of the upward signals by an amount compensating for a total attenuation of the upward signals by all of said one or more noise-reduction devices.

6. The system as claimed in claim 1, wherein said noise-reduction device includes:

a unit which obtains a level of a signal component demodulated through coherent detection of the upward signals;

a unit which obtains a level of a noise component demodulated through detection of noises

observed on the signal line during a time period when no signal component is present; and

a check unit which makes a comparison between the level of the signal component and the level of the noise component, and detects a noise increase based on the comparison.

A1 cont'd

7. The system as claimed in claim 1, wherein said noise-reduction device includes:

a unit which obtains a level of a signal component demodulated through coherent detection of the upward signals;

a unit which obtains a level of signal and noise components demodulated through detection of a high-frequency signal included within a frequency range of the upward signals;

a subtraction unit which obtains a noise level as a difference between the level of the signal component and the level of the signal and noise components; and

a check unit which compares the noise level with one of a reference level and the level of the signal component, and detects a noise increase based on the comparison.

8. The system as claimed in claim 1, wherein said noise-reduction device includes:

a unit which obtains a level of a signal component demodulated through coherent detection of the upward signals;

a unit which obtains a level of a noise

component demodulated through detection of noises observed on the signal line during a time period that is identified as a noise period when the level of the signal component is below a predetermine threshold;

a unit which obtains a level of signal and noise components demodulated through detection of a high-frequency signal included within a frequency range of the upward signals;

a subtraction unit which obtains a signal level as a difference between the level of the noise component and the level of the signal and noise components; and

a check unit which compares the signal level with the level of the noise component, and detects a noise increase based on the comparison.

A1 cont'd

9. A device for reducing noise in a communication system having a signal line, through which upward signals and downward signals are transmitted, comprising:

a noise-level-check unit which makes a comparison between a signal component and a noise component that are obtained from a signal line, and detects a noise increase regarding the upward signals based on the comparison; and

a noise-reduction unit which attenuates the upward signals by an increased amount and transmits a tone signal via downward signals if said noise-level-check unit detects the noise increase.

10. The device as claimed in claim 9, wherein

said noise-level-check unit includes:

a unit which obtains a level of a signal component demodulated through coherent detection of the upward signals;

a unit which obtains a level of a noise component demodulated through detection of noises observed on the signal line during a time period when no signal component is present; and

a check unit which makes a comparison between the level of the signal component and the level of the noise component, and detects a noise increase based on the comparison.

A1 cont'd

11. The device as claimed in claim 9, wherein said noise-level-check unit includes:

a unit which obtains a level of a signal component demodulated through coherent detection of the upward signals;

a unit which obtains a level of signal and noise components demodulated through detection of a high-frequency signal included within a frequency range of the upward signals;

a subtraction unit which obtains a noise level as a difference between the level of the signal component and the level of the signal and noise components; and

a check unit which compares the noise level with one of a reference level and the level of the signal component, and detects a noise increase based on the comparison.

12. The device as claimed in claim 9, wherein said noise-level-check unit includes:

a unit which obtains a level of a signal component demodulated through coherent detection of the upward signals;

a unit which obtains a level of a noise component demodulated through detection of noises observed on the signal line during a time period that is identified as a noise period when the level of the signal component is below a predetermine threshold;

a unit which obtains a level of signal and noise components demodulated through detection of a high-frequency signal included within a frequency range of the upward signals;

a subtraction unit which obtains a signal level as a difference between the level of the noise component and the level of the signal and noise components; and

a check unit which compares the signal level with the level of the noise component, and detects a noise increase based on the comparison.

A' cont'd

13. The device as claimed in claim 9, wherein said noise-reduction unit includes:

filters which separate downward signals and the upward signals from each other;

a variable attenuator which attenuates the upward signals by the increased amount in response to a control signal from said noise-level-check unit indicating a detection of the noise increase; and

a tone-signal-transmission unit which inserts the tone signal into the downward signals in response to the control signal indicating the detection of the noise increase.

A' concl.

14. The device as claimed in claim 9, wherein said noise-reduction unit transmits a tone signal via the upward signals if said noise-level-check unit detects the noise increase.

15. The device as claimed in claim 14, wherein said noise-reduction unit transmits the tone signal by including positional information in the tone signal.